Grounding Electrode Resistance Measurement

Presented by:

John T. Rowe, Jr., PE

Measurement Requirement:

1700-3(K) Grounding

- In addition to NEC requirements, test grounding electrode resistance …….. for a maximum of 20 ohms. Furnish and install additional ground rods to grounding electrode system as necessary to meet test requirements. Submit a completed Inductive Detection Loop & Grounding Test Results form. The form is located on the Department's website. ….

Measurement Requirement:

Preventive Maintenance checklist:

- Check Grounding Resistance and Bonding Connections and Conductors every 6 months

Other Requirements:

1710-3

.....

- **Messenger Cable for Signal Heads or Loop Lead-In Cable:** For messenger cable attached to joint use poles, install a new grounding system that complies with Article 1720-3 for bonding messenger cable. If a pole ground exists on the joint use pole, bond new pole grounding system to existing pole ground using number 6 AWG minimum solid bare copper grounding wire terminated with split bolt connectors or Burndy clamps (UCG25RS) at each end.
- **Messenger Cable for Communications Cable:** For messenger cable attached to joint use poles, bond messenger cable to existing pole ground using Burndy clamps (UCG25RS) at ends and at 1300-foot intervals. If existing poles do not have a grounding system, install new grounding system that complies with Article 1720-3 for bonding messenger cable. ……

Other Requirements:

1720-3

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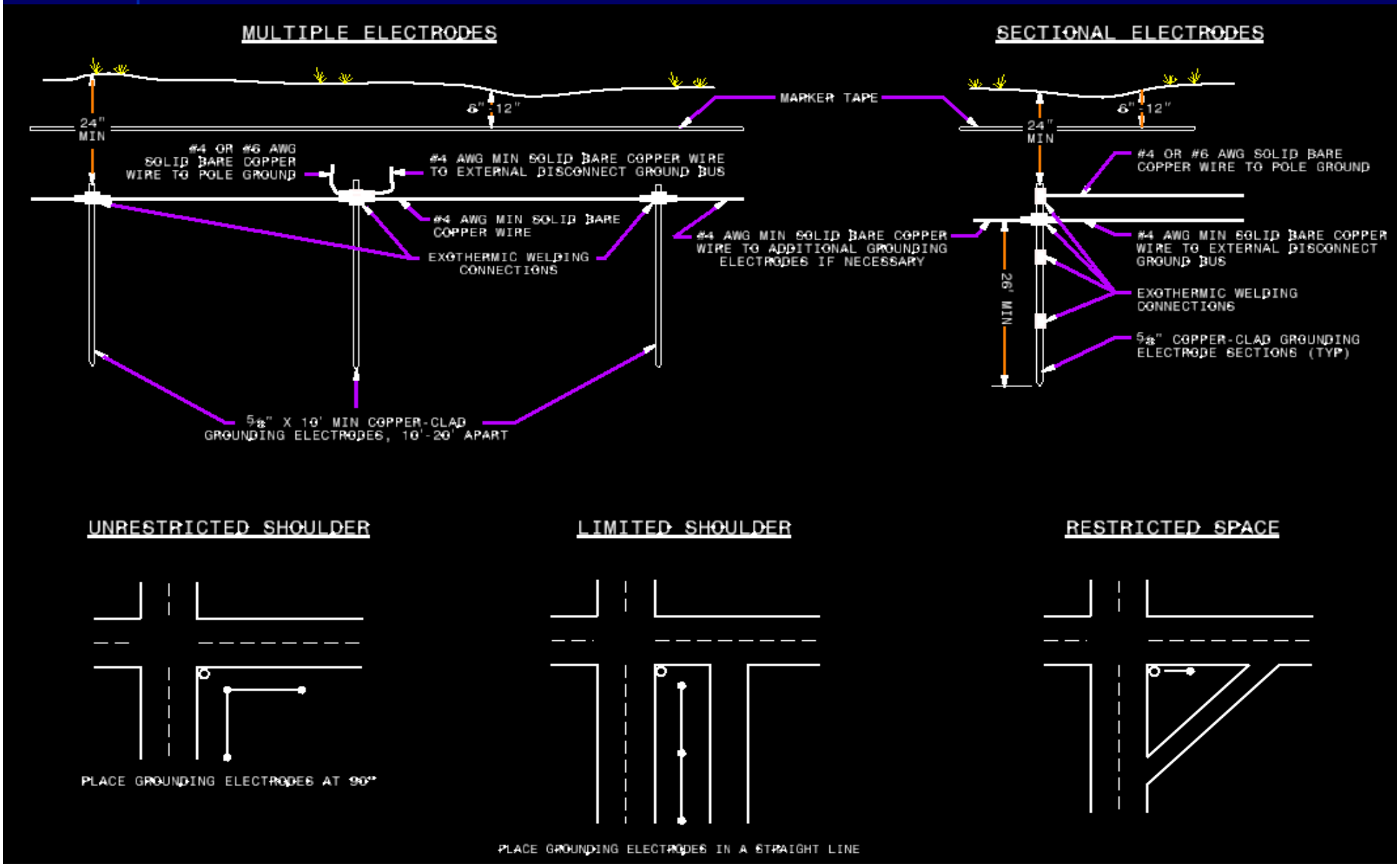
- On new Department owned poles, install a grounding system consisting of number 4 or 6 AWG solid bare copper wire that is exothermically welded to a ground rod. ....

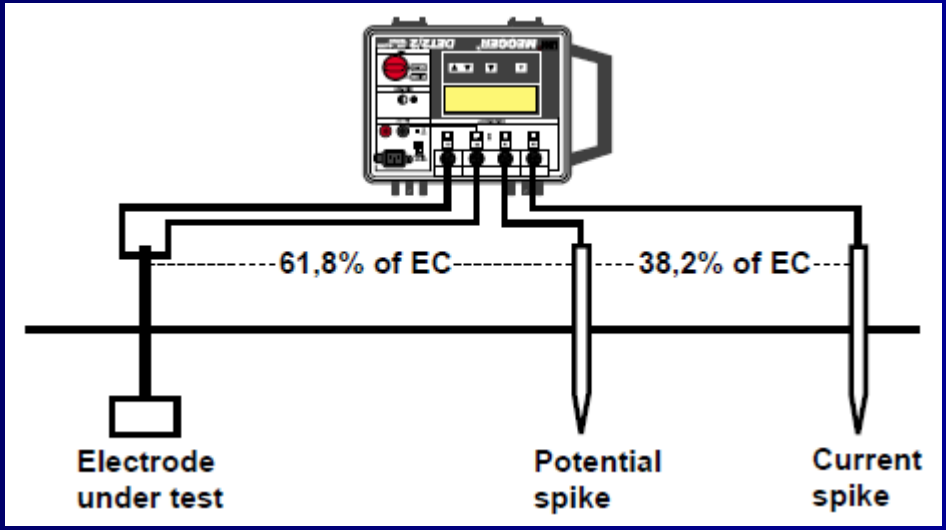
Other Requirements:

Standard Drawing 1700.02



Three Point Test

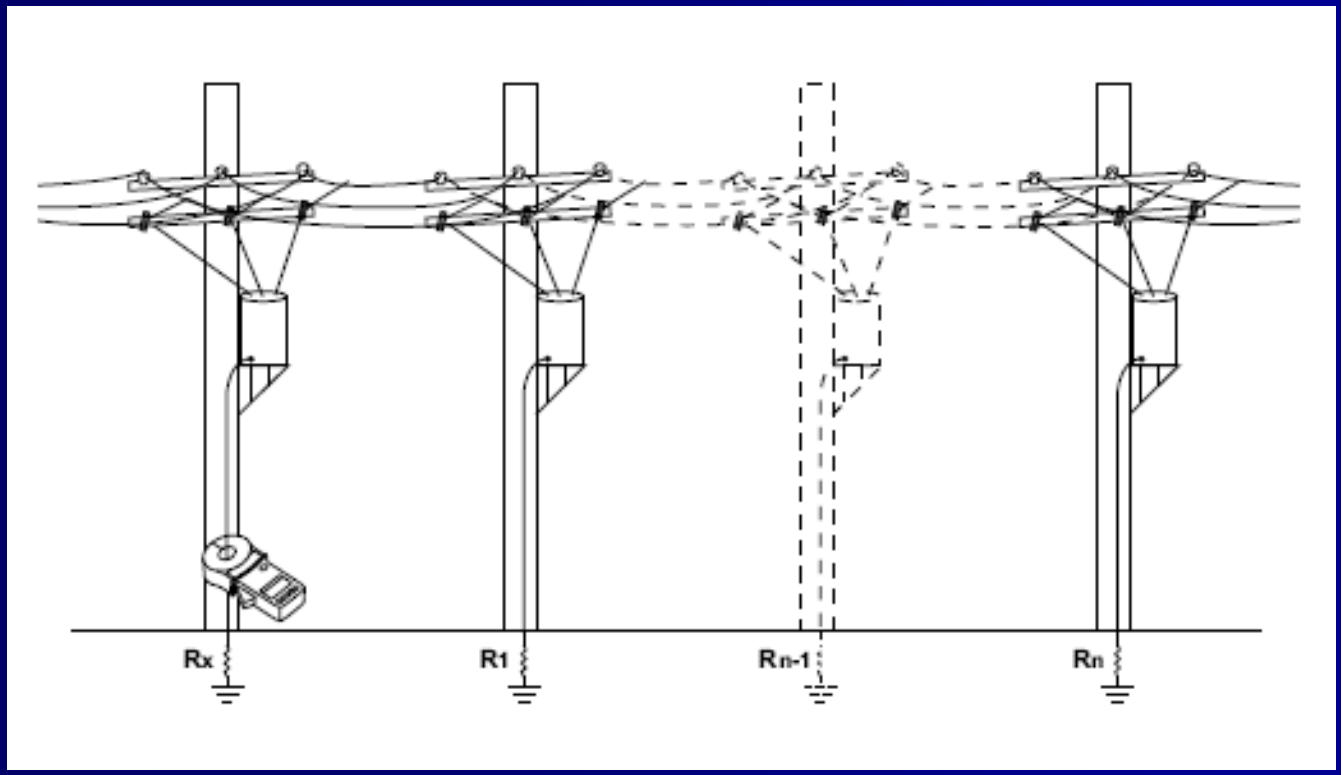
- Disconnect grounding electrode cable
- Connect spikes per manufacturer's instructions



- Perform test on instrument

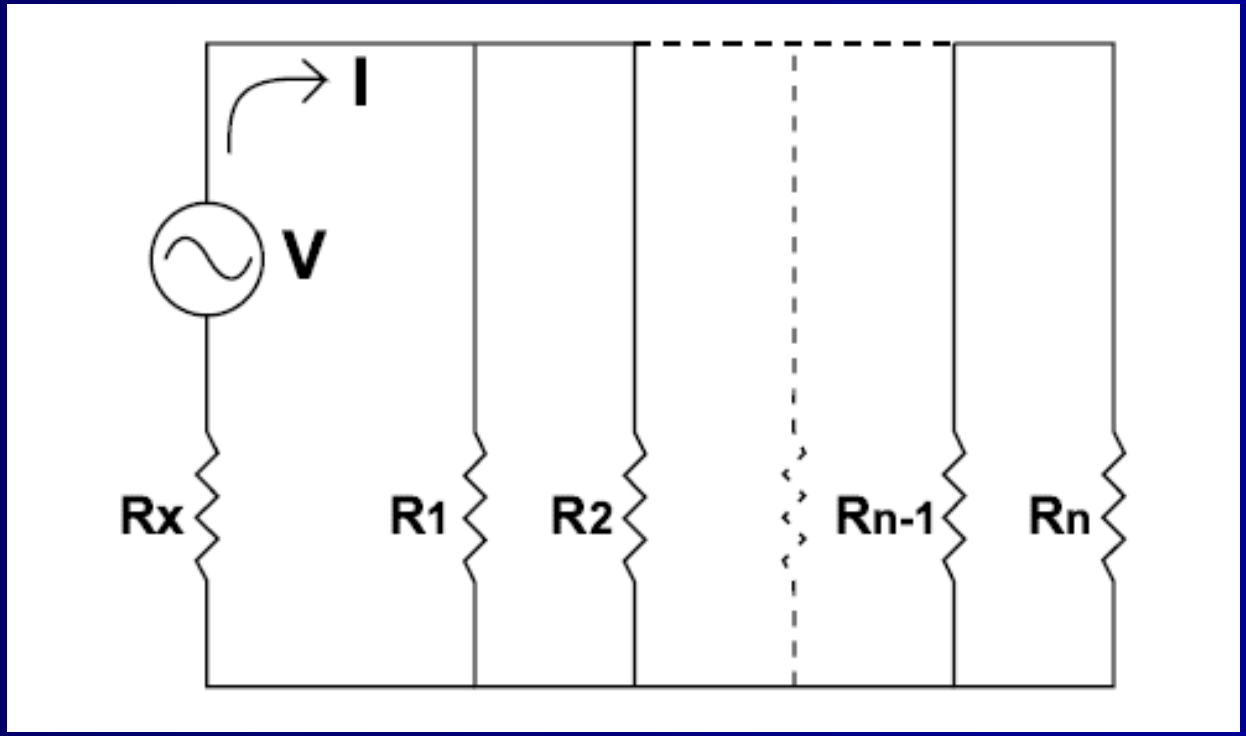
Clamp On Test

Simple application of tester:



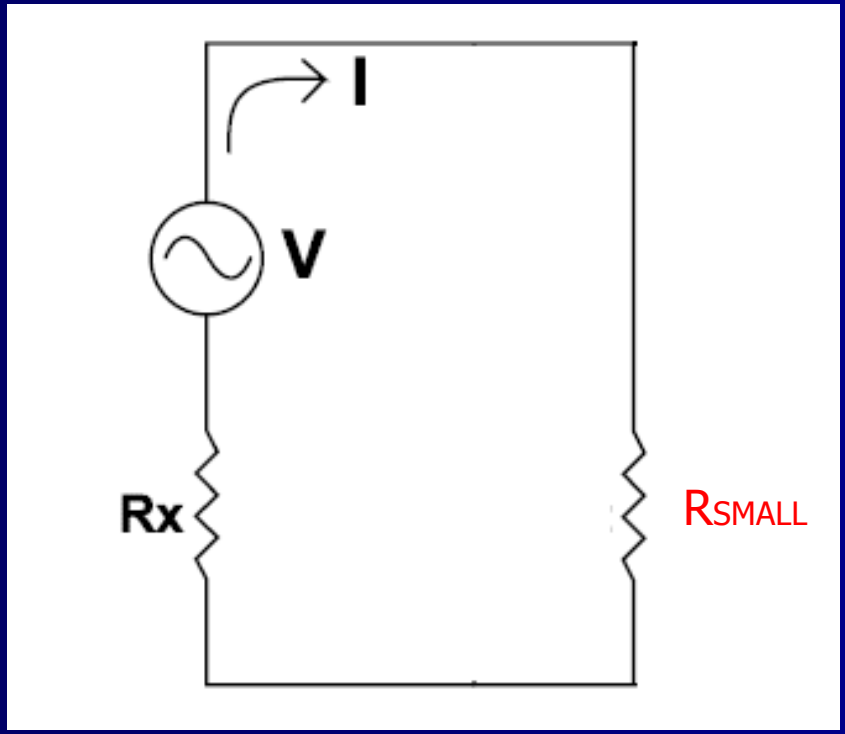
Clamp On Test

Circuit seen by tester:



Clamp On Test

Circuit seen by tester:

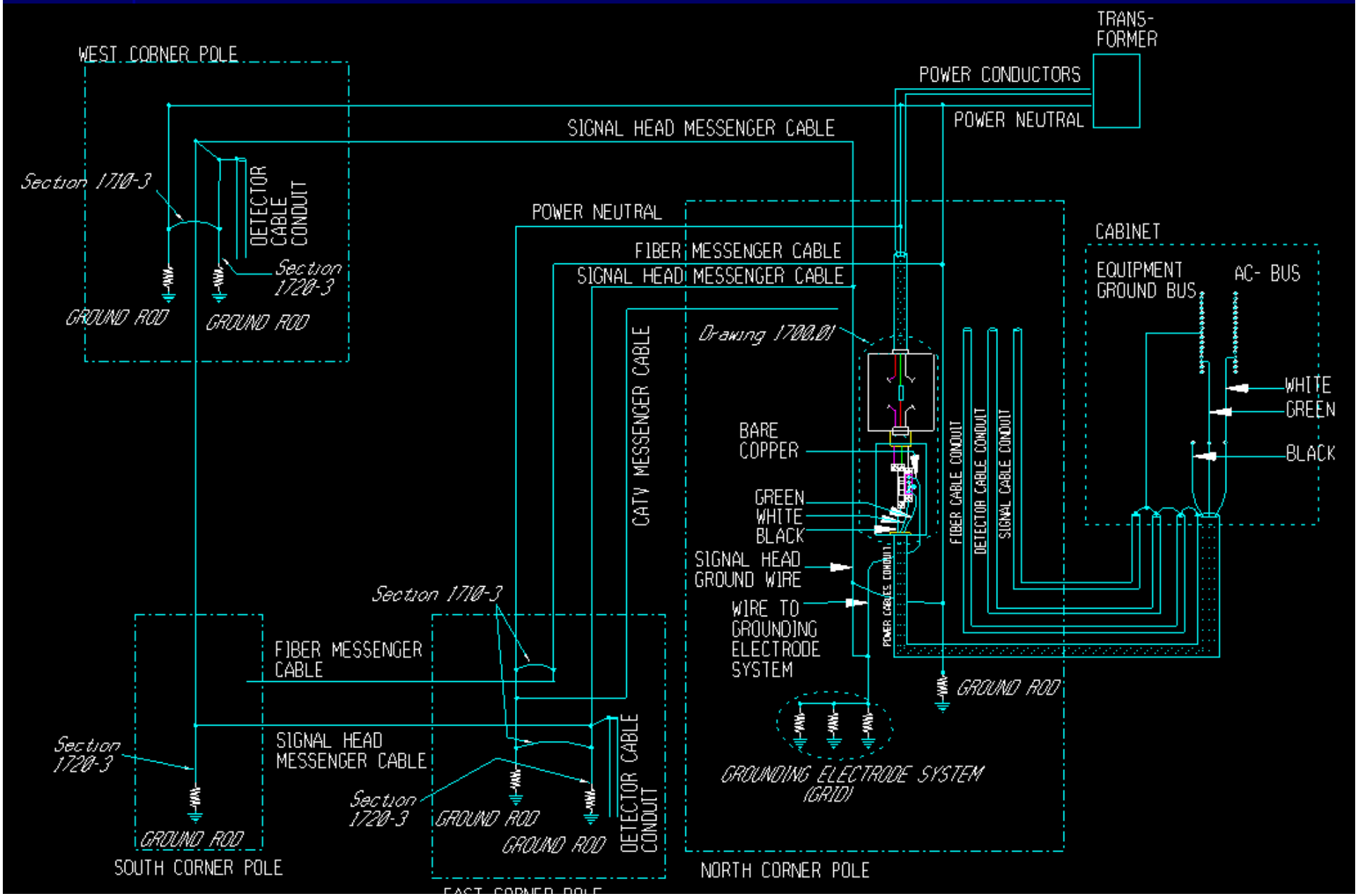


Clamp On Test

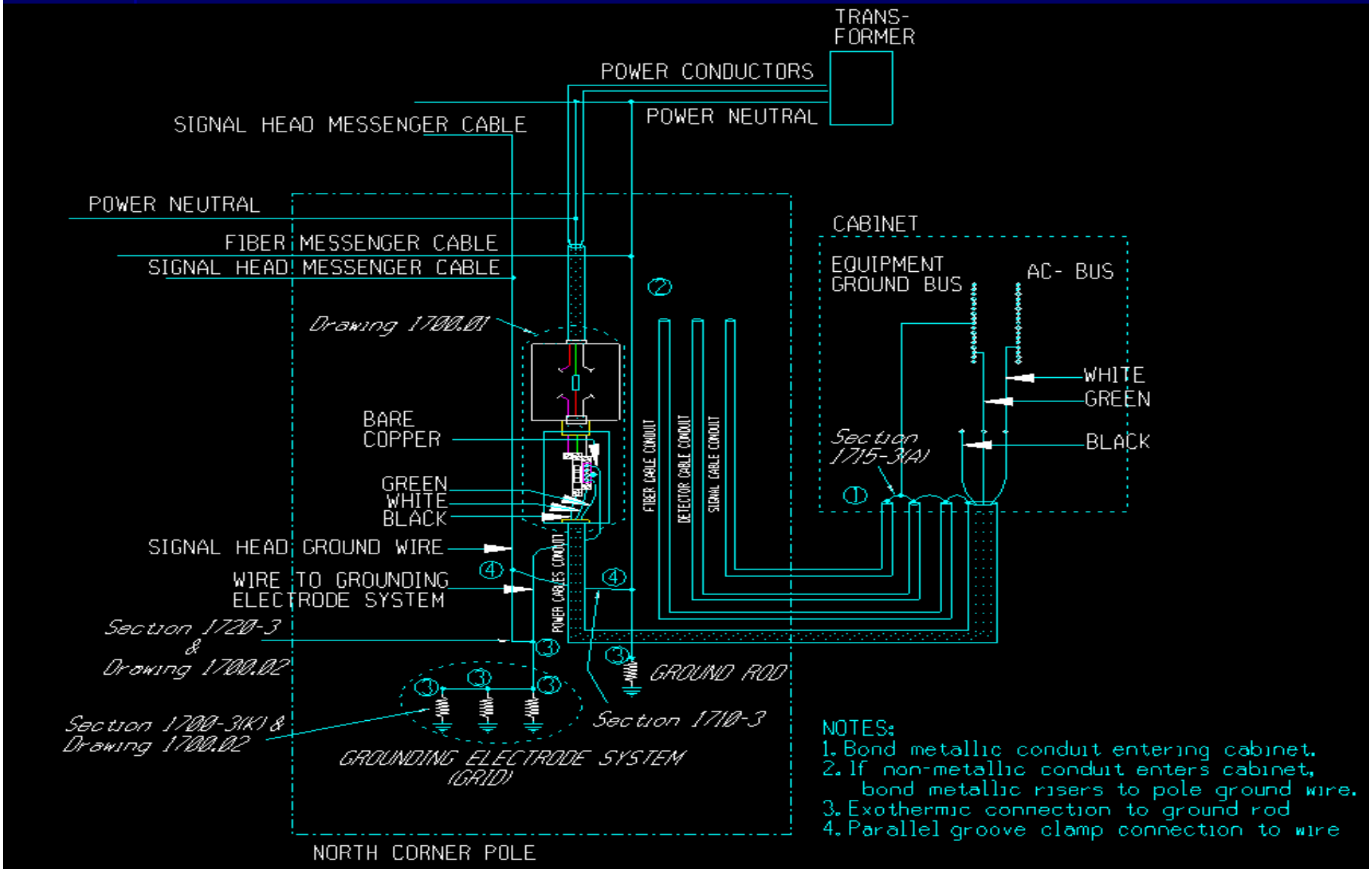
Circuit seen by tester …

R < .1Ω	Displayed when measured resistance is below 0.1Ω. This may indicate that grounding electrode you are clamped onto is continuous with itself (the instrument is measuring a metallic loop and not the ground electrode resistance). In this situation, electrode resistance measurements may not be valid. The main display can measure between 0.7 to 0.07Ω, but without any specified accuracy.

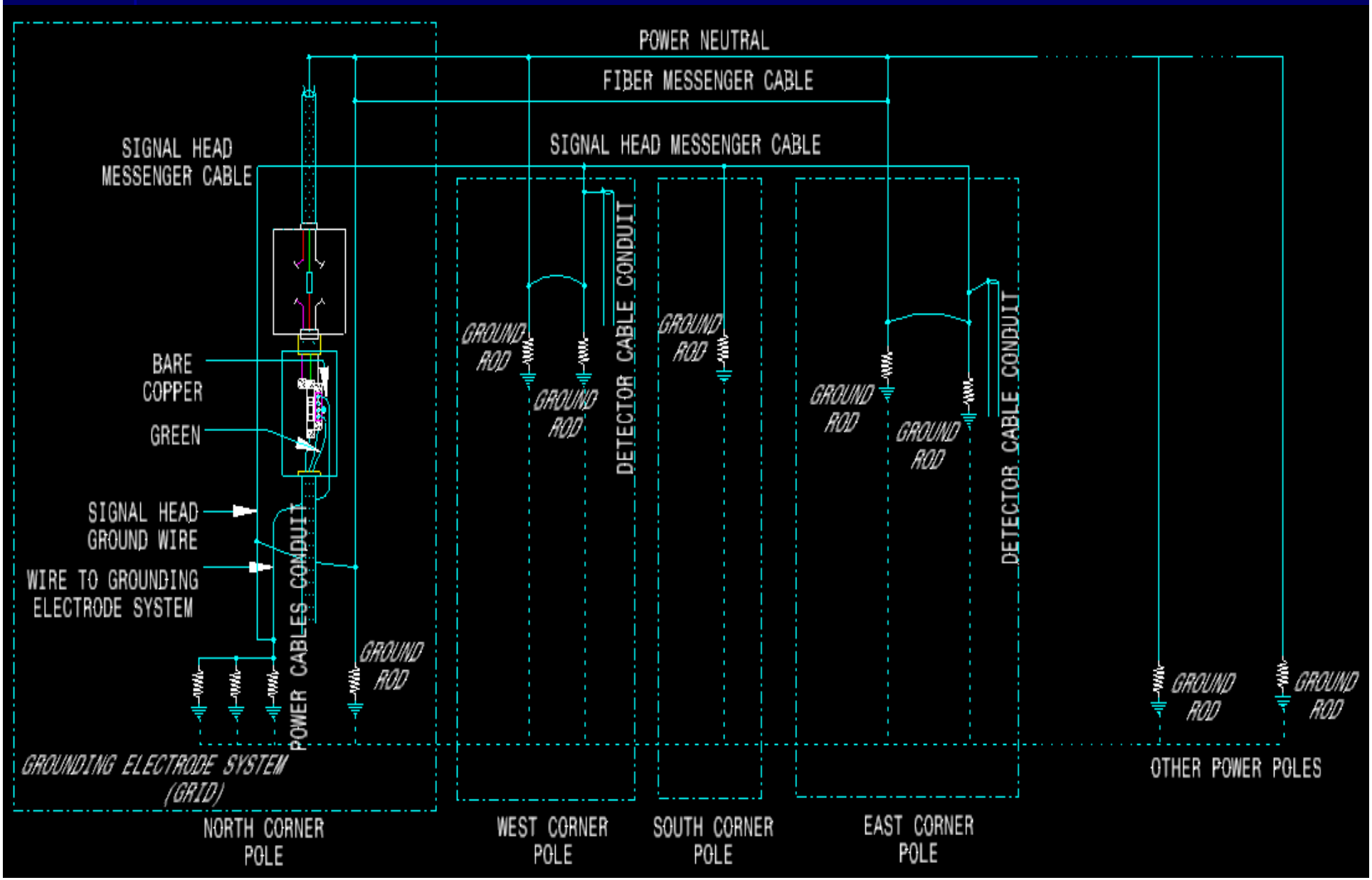
Typical Intersection Schematic:



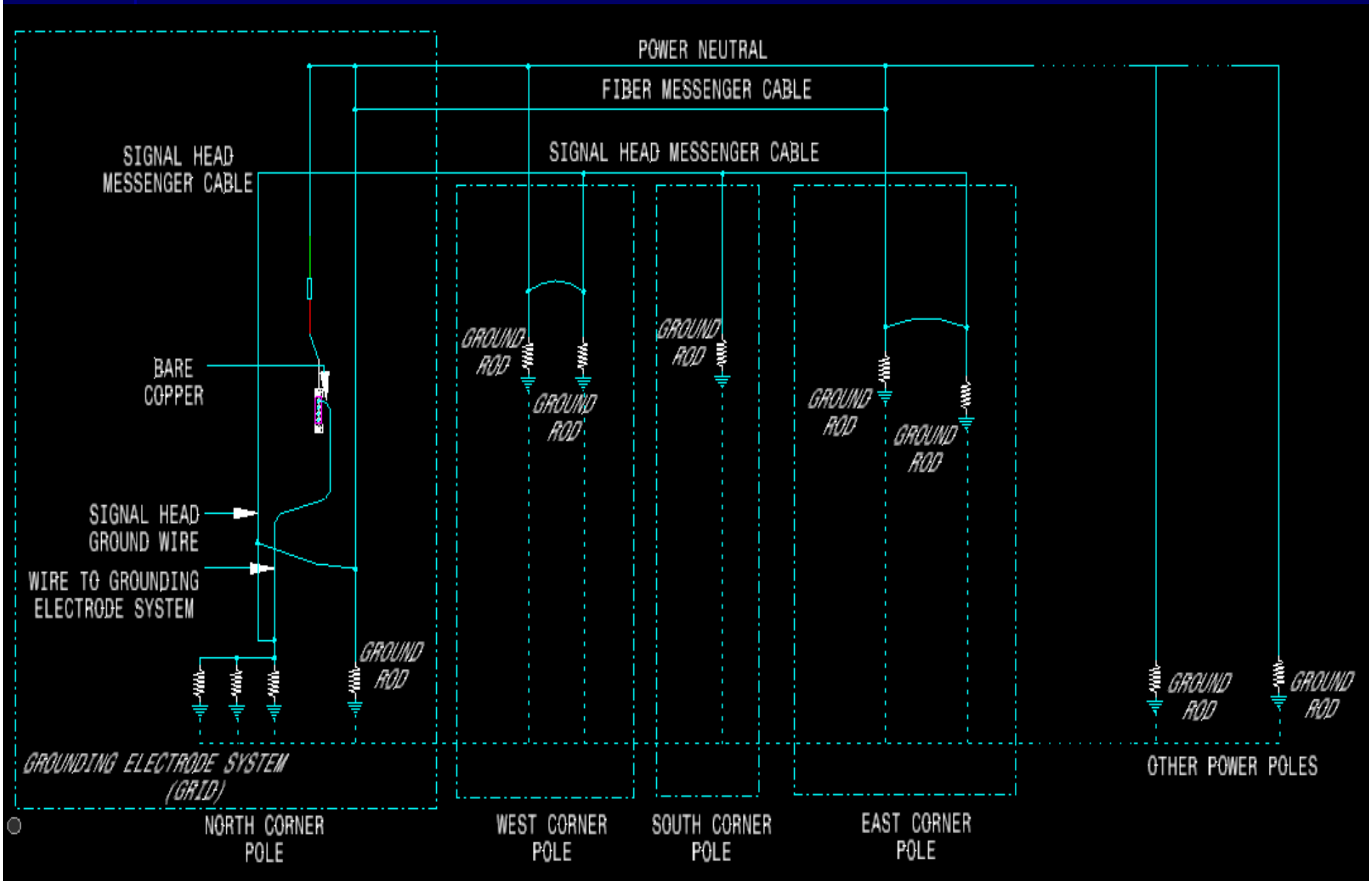
Typical Intersection Schematic:



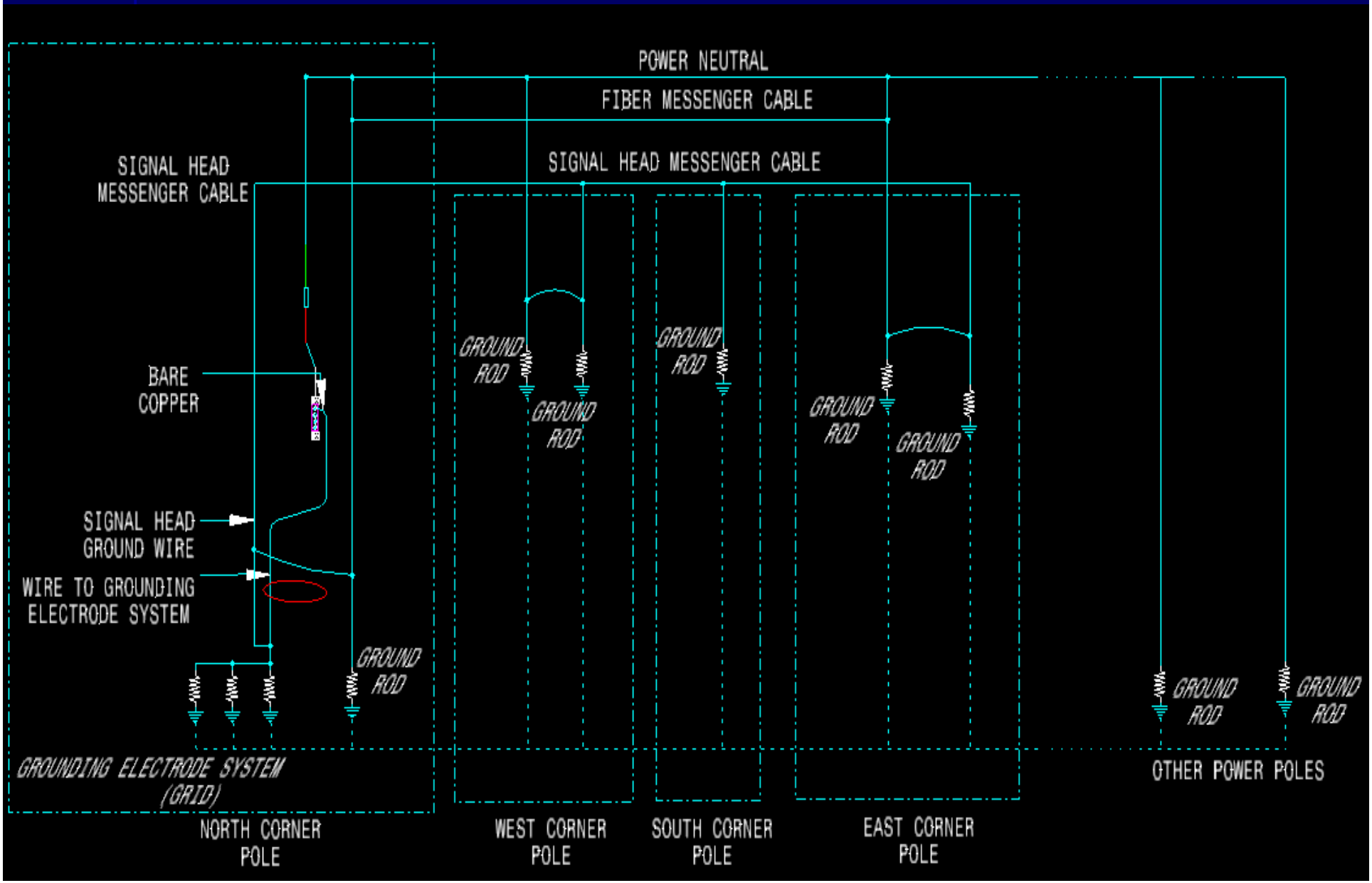
Equivalent Ground Schematic:



Equivalent Ground Schematic:



Measurement Equivalent Ground Schematic (1):



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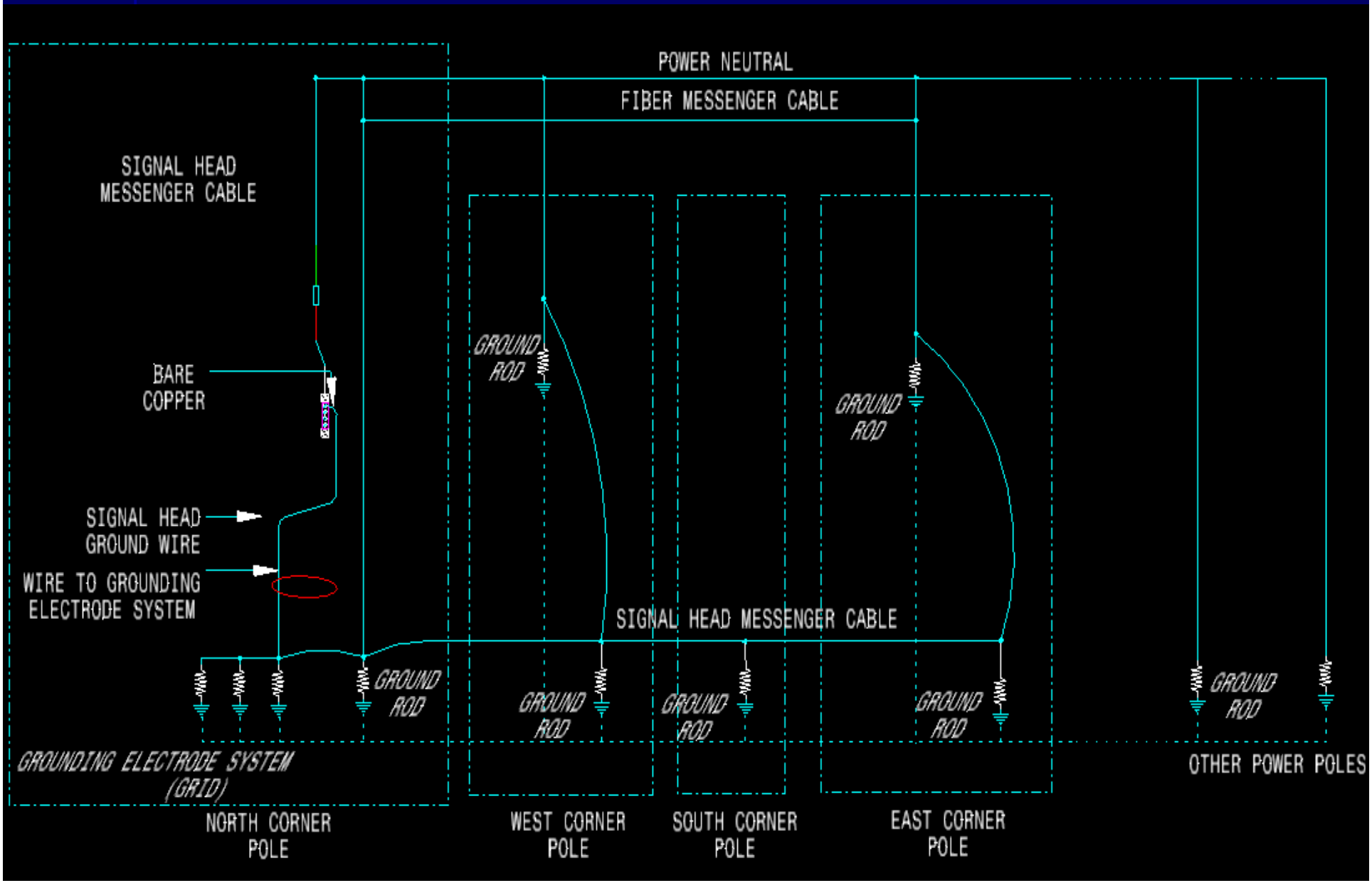

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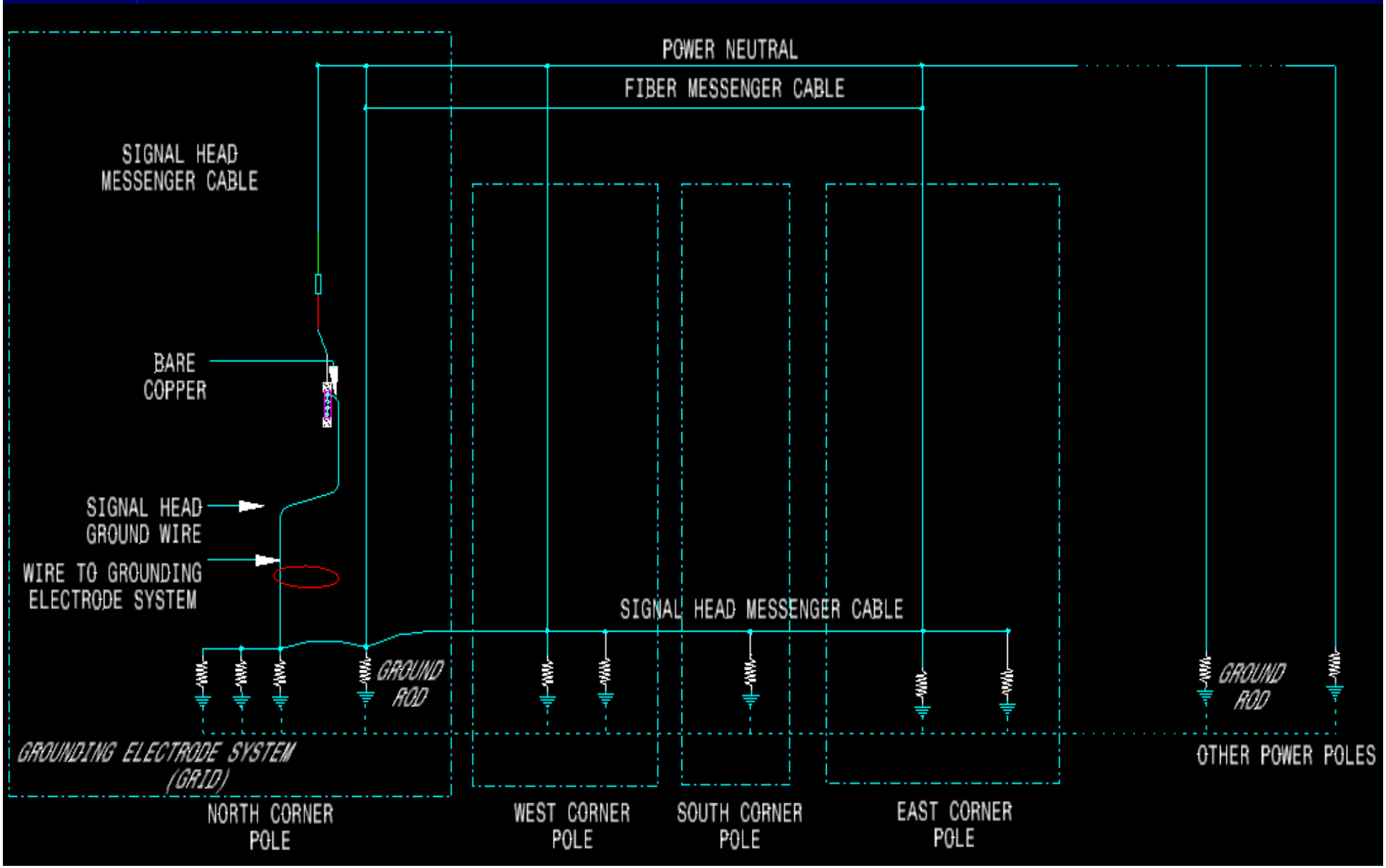

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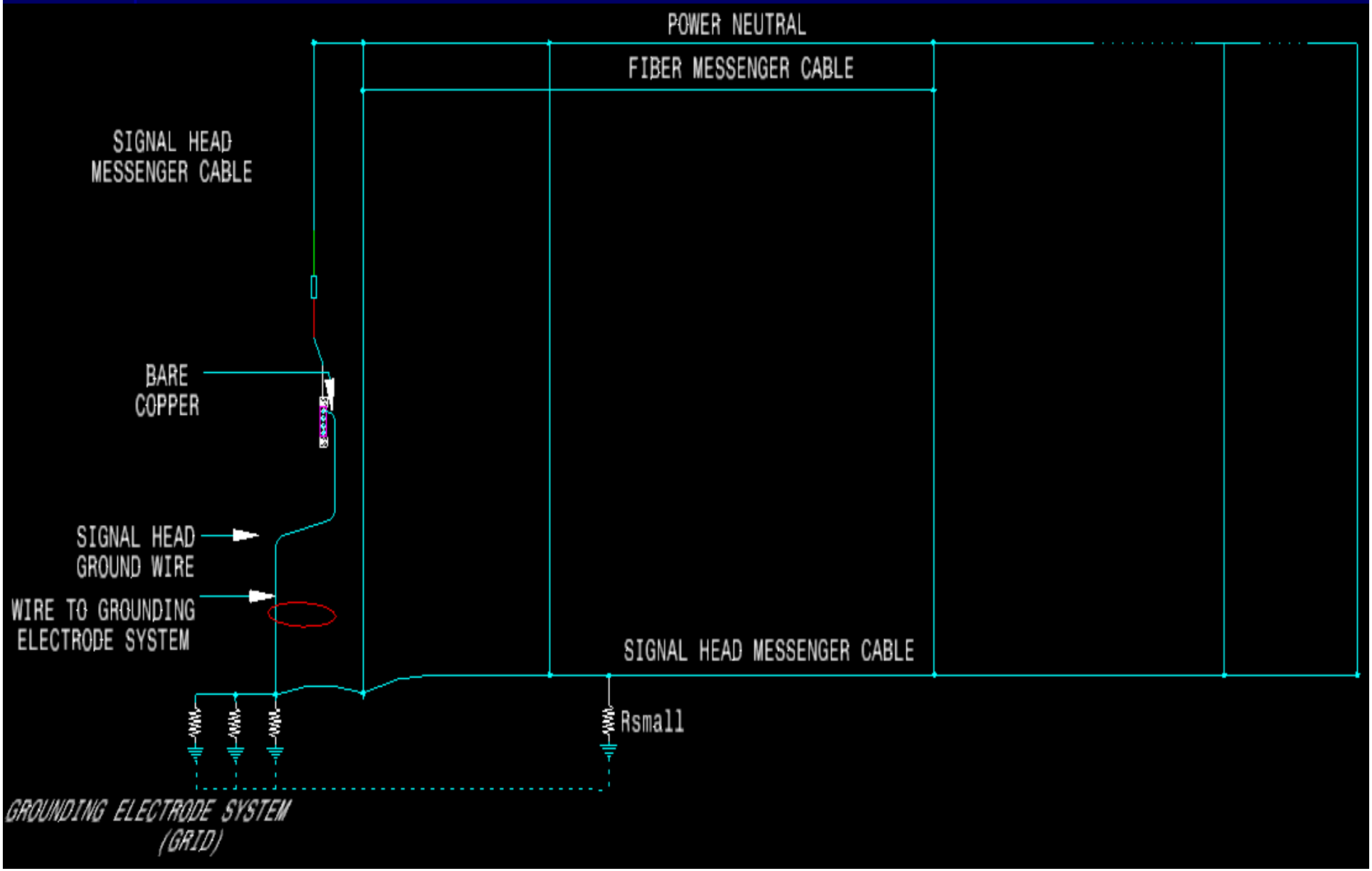
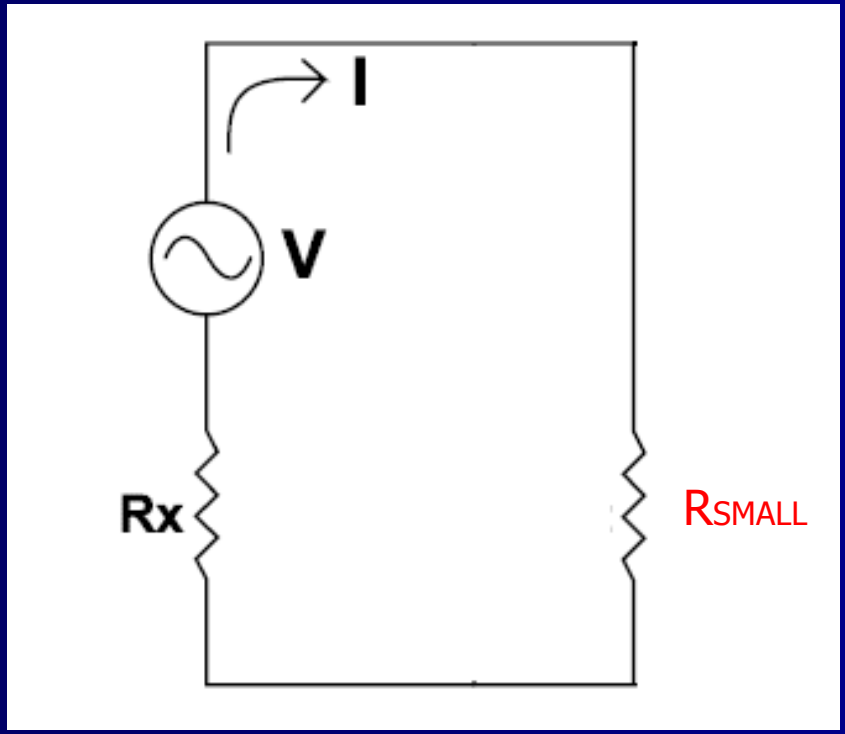


Clamp On Test

Circuit seen by tester:



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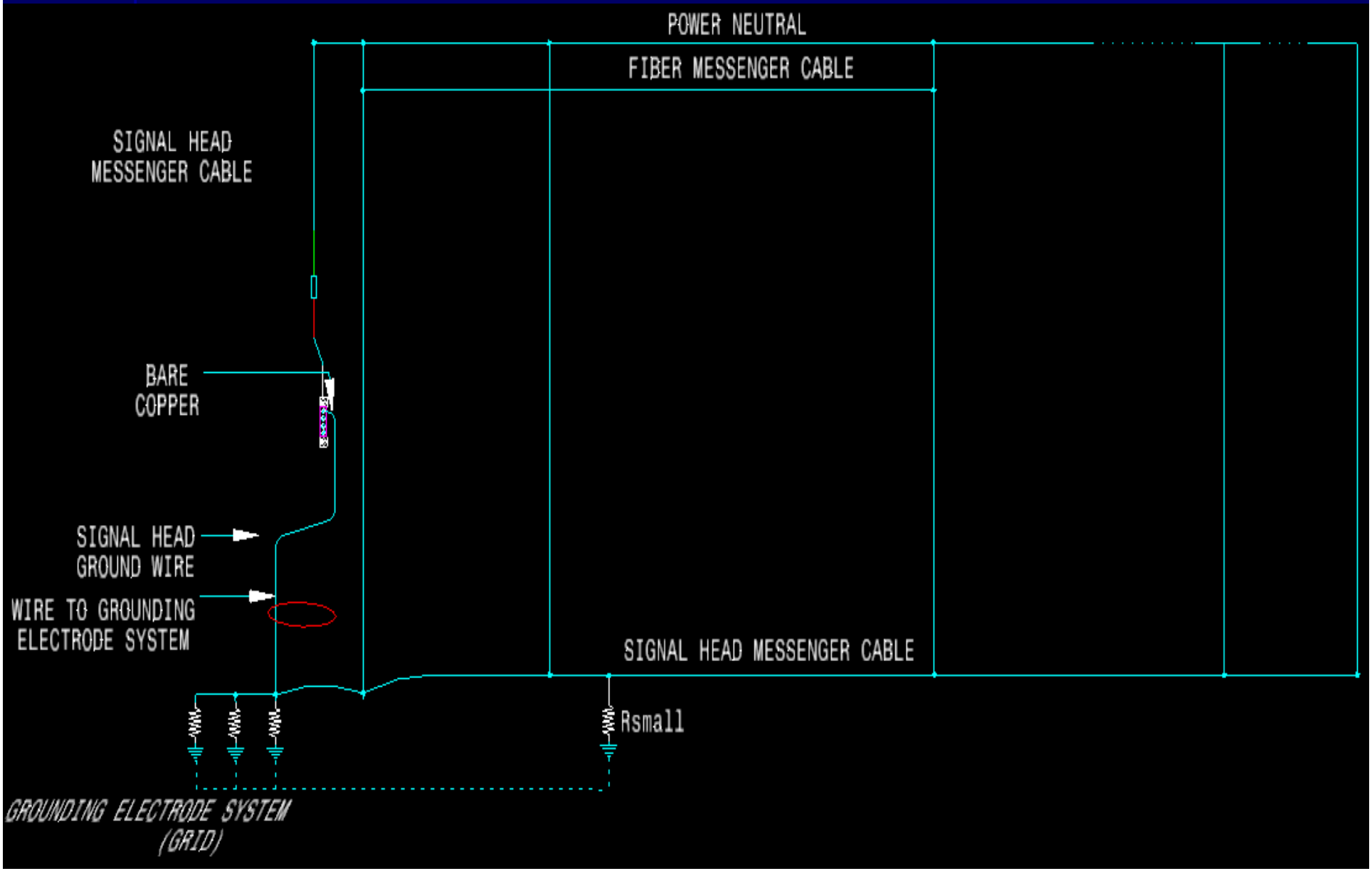
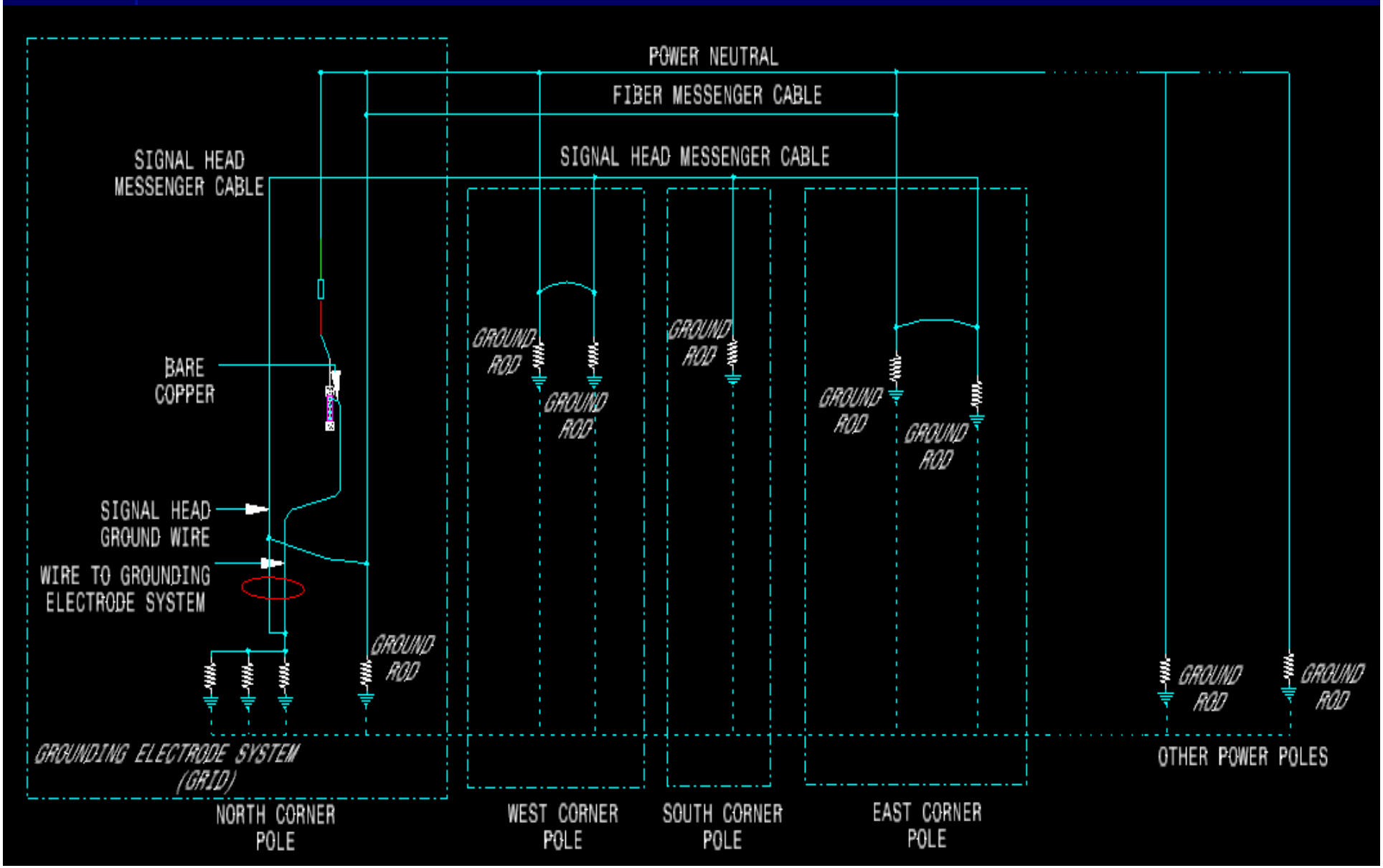


Measurement Equivalent Ground Schematic (2):



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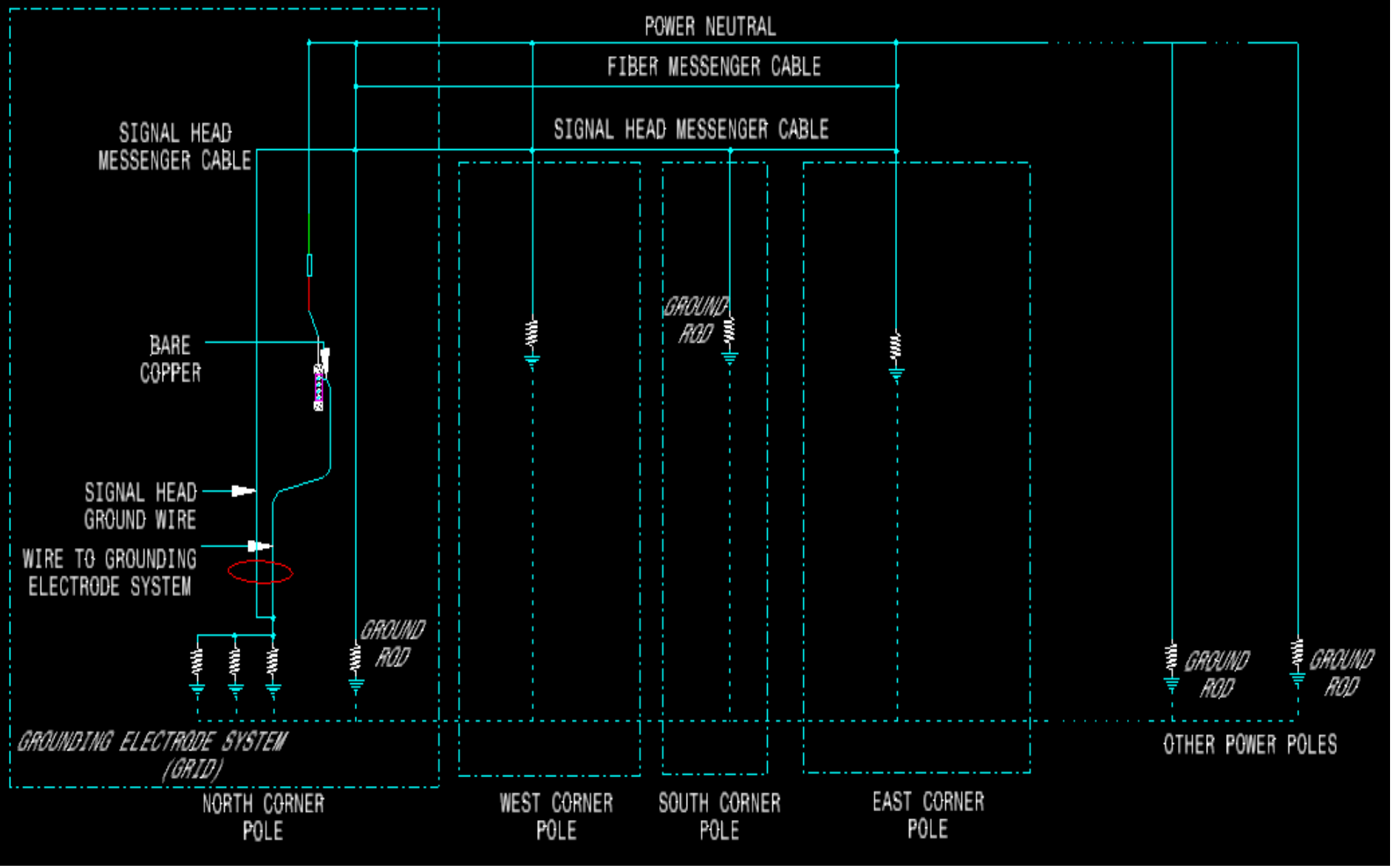

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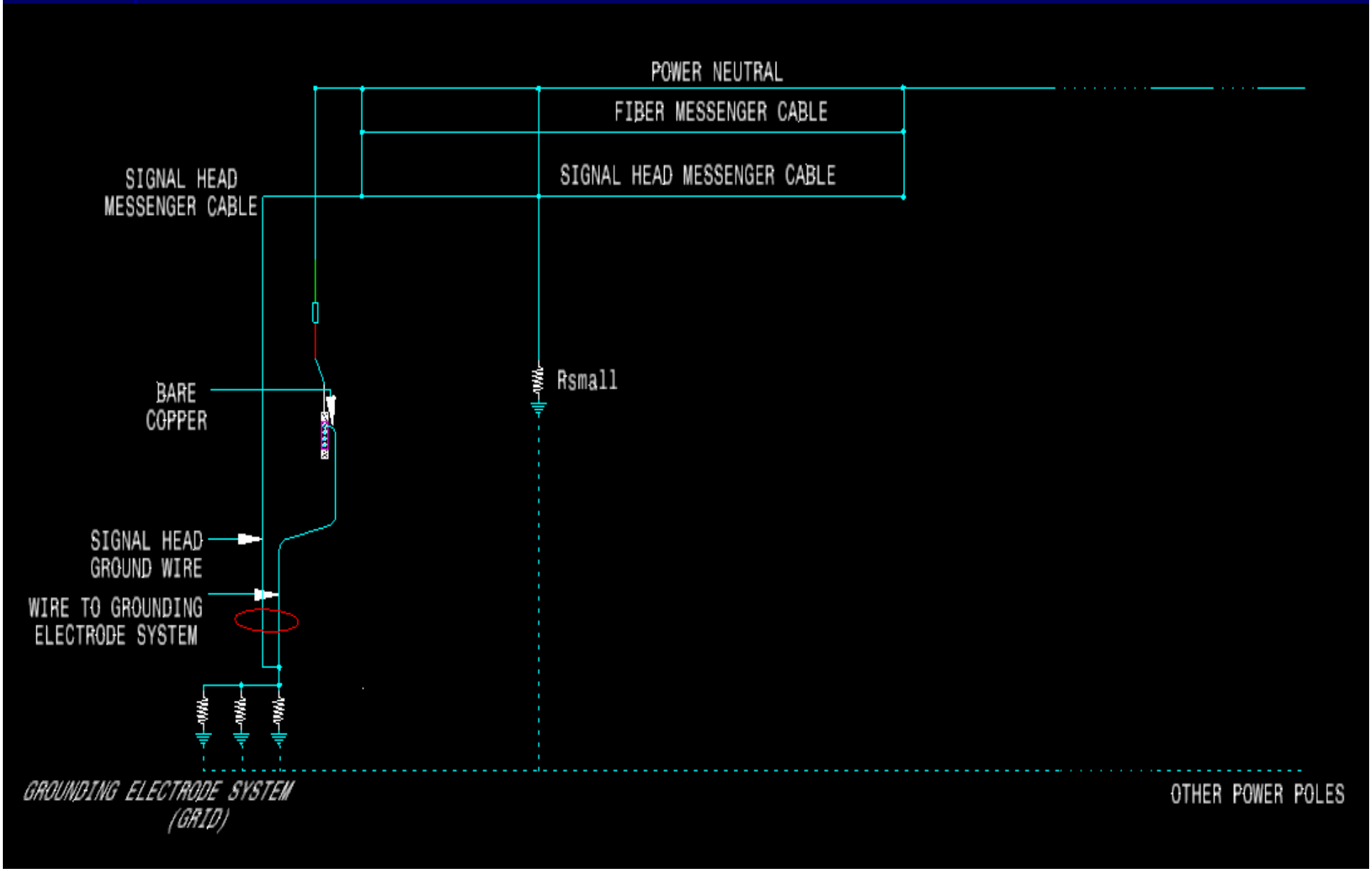
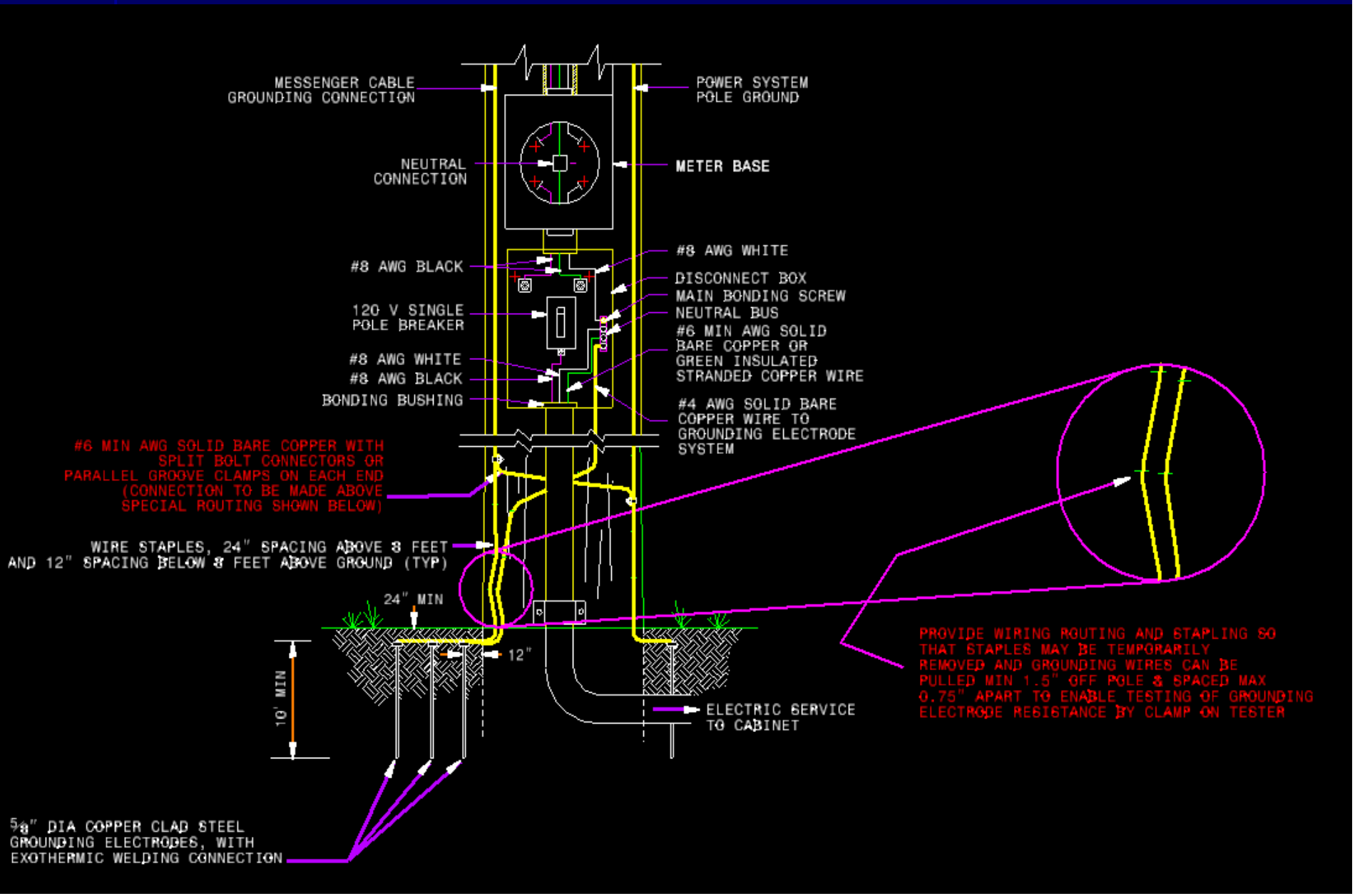


New Standard Drawing



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FOR MORE INFO...

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